

AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

1. CANCEL
2. (CURRENTLY AMENDED) The spin valve sensor as recited in claim [[1]] 4, wherein the upper layer has a thickness of at least 4 Å.
3. (CURRENTLY AMENDED) The spin valve sensor as recited in claim [[1]] 4, wherein the upper layer has a thickness of less than 5 Å.
4. (CURRENTLY AMENDED) A spin valve (SV) sensor, comprising:
 - a pinned layer having a pinned layer magnetization;
 - a free layer disposed towards the pinned layer, the free layer having a free layer magnetization perpendicular to the pinned layer magnetization in the absence of an external field;
 - a spacer layer disposed between the free layer and the pinned layer;
 - a pinning layer disposed towards the pinned layer for fixing the pinned layer magnetization;
 - an underlayer disposed towards the pinning layer, the underlayer comprising NiFeX; and
 - an upper layer disposed adjacent the underlayer and the pinning layer, the upper layer comprising at least one material selected from the group consisting of NiFe and CoFe for increasing a GMR ratio associated with the SV sensor;
 - wherein the sensor provides an increase of $\Delta R/R$ of at least 5% when compared to an otherwise identical sensor not having the upper layer;

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wherein the upper layer is doped with a material other than NiFe or CoFe for decreasing an electrical conductivity of the upper layer.

5. (CURRENTLY AMENDED) The spin valve sensor as recited in claim [[1]] 4, wherein the underlayer comprises NiFeCr.
6. (CURRENTLY AMENDED) The spin valve sensor as recited in claim [[1]] 4, wherein the SV sensor is a component of a disk drive system.
7. (CURRENTLY AMENDED) The spin valve sensor as recited in claim [[1]] 4, wherein the underlayer includes 40 +/- 5 Atomic % Cr.
8. (CURRENTLY AMENDED) The spin valve sensor as recited in claim [[1]] 4, wherein the pinned layer comprises a Ru layer, a first CoFe layer disposed adjacent a first side of the Ru layer and a second CoFe layer disposed adjacent a second side of the Ru layer.
9. (CURRENTLY AMENDED) A spin valve (SV) sensor, comprising:
 - a pinned layer having a pinned layer magnetization;
 - a free layer disposed towards the pinned layer, the free layer having a free layer magnetization perpendicular to the pinned layer magnetization in the absence of an external field;
 - a spacer layer disposed between the free layer and the pinned layer;
 - a pinning layer disposed towards the pinned layer for fixing the pinned layer magnetization;
 - an underlayer disposed towards the pinning layer, the underlayer comprising NiFeX; and

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an upper layer disposed adjacent the underlayer and the pinning layer, the upper layer comprising at least one material selected from the group consisting of NiFe and CoFe for increasing a GMR ratio associated with the SV sensor;

wherein the sensor provides an increase of $\Delta R/R$ of at least 5% when compared to an otherwise identical sensor not having the upper layer;

wherein the upper layer includes both NiFe and CoFe.

10. (CURRENTLY AMENDED) The spin valve sensor as recited in claim ~~[[1]]~~ 4, wherein the underlayer comprises NiFeX where X is not Cr.
11. (PREVIOUSLY PRESENTED) The spin valve sensor as recited in claim ~~[[1]]~~ 4, wherein the upper layer is non-magnetic.
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13. (CURRENTLY AMENDED) The method as recited in claim ~~[[12]]~~ 15, wherein the upper layer has a thickness of at least 4 Å.
14. (PREVIOUSLY PRESENTED) The method as recited in claim 13, wherein the upper layer has a thickness of no more than 20 Å.
15. (PREVIOUSLY PRESENTED) A method of fabricating a spin valve (SV) sensor comprising:
 - depositing an underlayer comprising NiFeX, where X is not Cr;
 - depositing an upper layer adjacent the underlayer, the upper layer comprising at least one material selected from the group consisting of NiFe and CoFe for increasing a GMR ratio associated with the SV sensor;
 - depositing a pinning layer towards the upper layer;

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depositing a pinned layer towards the pinning layer, the pinned layer having a pinned layer magnetization;
depositing a spacer layer towards the pinned layer; and
depositing a free layer towards the spacer layer, the free layer having a free layer magnetization perpendicular to the pinned layer magnetization in the absence of an external field;
wherein the upper layer is doped for at least one of reducing an electrical conductivity of the upper layer and reducing magnetic properties of the upper layer.

16. (PREVIOUSLY PRESENTED) A method of fabricating a spin valve (SV) sensor comprising:

depositing an underlayer comprising NiFeX, where X is not Cr;
depositing an upper layer adjacent the underlayer, the upper layer comprising at least one material selected from the group consisting of NiFe and CoFe for increasing a GMR ratio associated with the SV sensor;
depositing a pinning layer towards the upper layer;
depositing a pinned layer towards the pinning layer, the pinned layer having a pinned layer magnetization;
depositing a spacer layer towards the pinned layer; and
depositing a free layer towards the spacer layer, the free layer having a free layer magnetization perpendicular to the pinned layer magnetization in the absence of an external field;
wherein the upper layer includes both NiFe and CoFe.

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19. (PREVIOUSLY PRESENTED) A spin valve (SV) sensor comprising:

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- a pinned layer having a pinned layer magnetization;
- a free layer disposed towards the pinned layer, the free layer having a free layer magnetization perpendicular to the pinned layer magnetization in the absence of an external field;
- a pinning layer disposed towards the pinned layer for fixing the pinned layer magnetization;
- an underlayer disposed towards the pinning layer, the underlayer comprising NiFeCr; and
- an upper layer disposed adjacent the underlayer and the pinning layer, the upper layer comprising a material selected from the group consisting of NiFe and CoFe for increasing a GMR ratio associated with the SV sensor;

wherein the upper layer is doped with a material other than NiFe or CoFe for reducing at least one of an electrical conductivity of the upper layer and magnetic properties of the upper layer.

20. (PREVIOUSLY PRESENTED) A spin valve (SV) sensor comprising:
- a single pinned layer having a pinned layer magnetization, the pinned layer comprising a Ru layer with a first CoFe layer disposed adjacent a first side of the Ru layer and a second CoFe layer disposed adjacent a second side of the Ru layer;
 - a free layer disposed towards the pinned layer, the free layer having a free layer magnetization perpendicular to the pinned layer magnetization in the absence of an external field, the free layer comprising a NiFe layer with a third CoFe layer disposed adjacent thereto;
 - a spacer layer disposed between the free layer and the pinned layer;
 - a pinning layer disposed towards the pinned layer for fixing the pinned layer magnetization, the pinning layer comprising PtMn;
 - an underlayer disposed towards the pinning layer, the underlayer comprising NiFeCr; and

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an upper layer disposed towards the underlayer and the pinning layer, the upper layer comprising a material selected from the group consisting of NiFe and CoFe for increasing a GMR ratio associated with the SV sensor;

wherein the upper layer has a thickness less than 20 Å;

wherein the upper layer is doped with a material other than NiFe or CoFe for reducing at least one of an electrical conductivity of the upper layer and magnetic properties of the upper layer;

wherein the sensor provides an increase of $\Delta R/R$ of at least 5% when compared to an otherwise identical sensor not having the upper layer.

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